HIGH TEMPERATURE HEAT STORAGE

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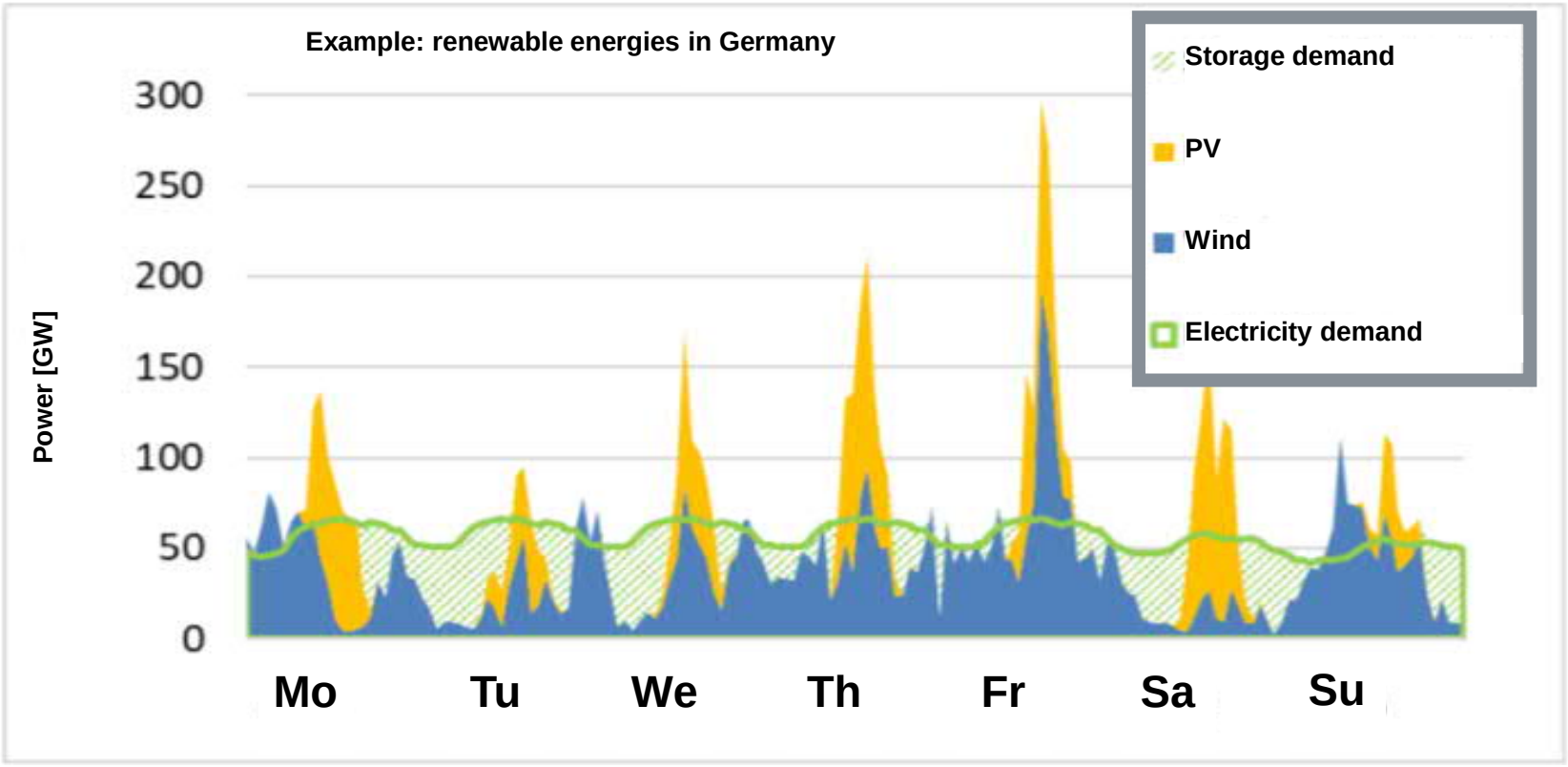
ENERGY STORAGE

Why do we need energy storage?



Taken from Prof. Dr.-Ing. Ulf Hermann, FH Aachen

HEAT STORAGE

Technology

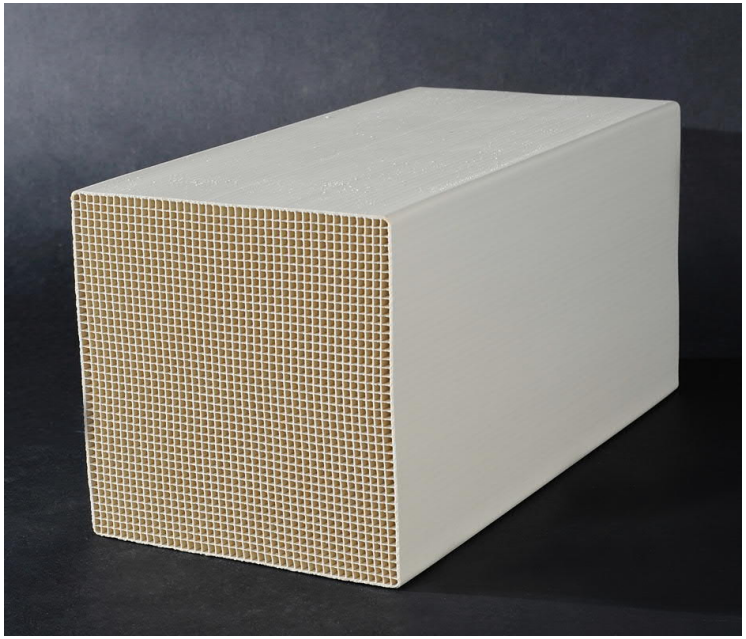
- Heat is stored in a bed of ceramic honeycombs media
- Air is used as transport medium
- The system is divided into a cold and a hot air section
- The low velocity of the transport medium reduces the requirements for the lining

Solar Institut Jülich

HEAT STORAGE

Technology

- Storage system is a proven technology (similar systems are in operation in regenerative thermal oxidizers for more than 30 years).
- No loss of capacity by chemical degradation (like battery systems or thermal oil), no aging of material, no memory effect.
- High possible storage temperatures (up to 1300°C /2372°F in operation, even more possible)
- High global product availability, material is based on Al_2O_3 and SiO_2
- large scale production sites already existing (annual production for >100 GWh heat storages)
- High civil acceptance expected, as…
  - Non-hazardous material
  - No fire load
  - No pollution of air, water, soil
  - No Atex zones



Ceram Austria GmbH

HEAT STORAGE

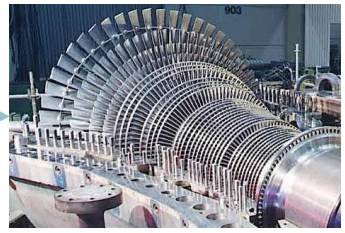
Functional principle

Excess energy

Storage

Utilization

>90% efficiency
@<24 h storage



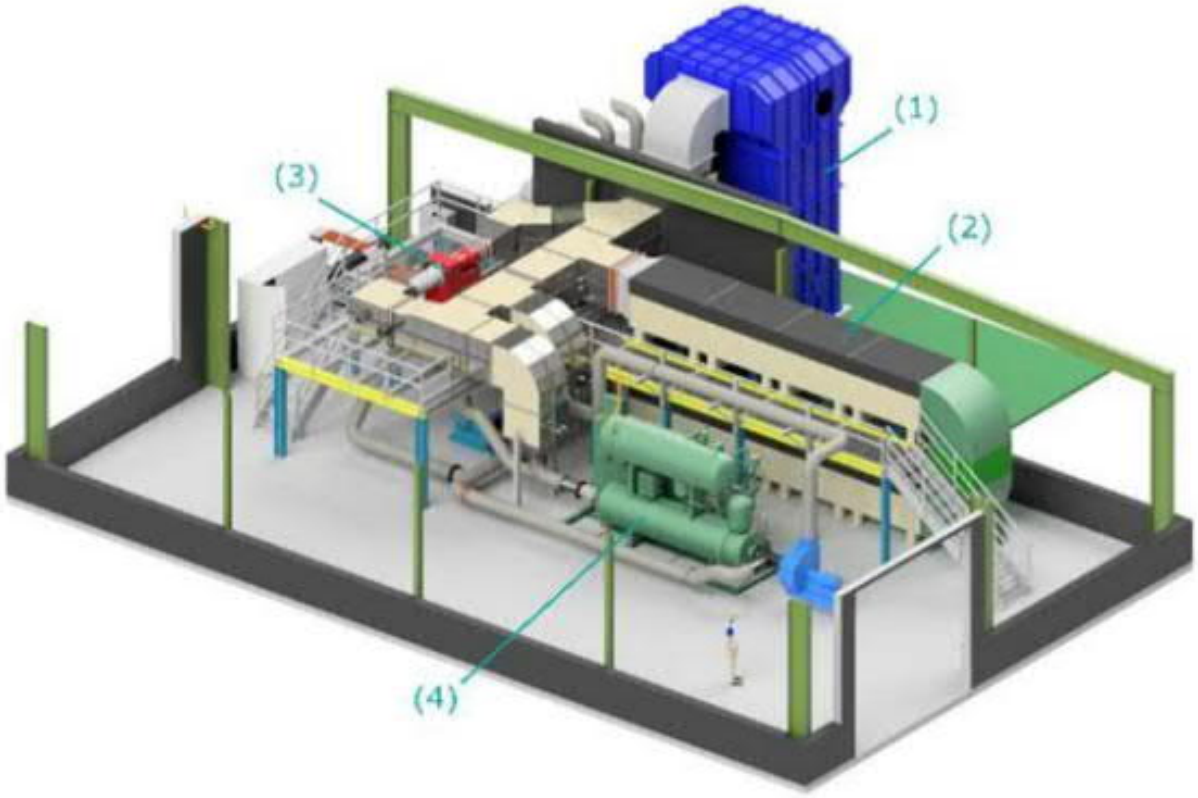
HEAT STORAGE

Demonstration plant 1

Target: provision of heat and electricity from grid excess energy

System components:

- 2 MWh storage capacity @ 1000°C (1)
- Conversion Electricity – Heat (electrical heater max.1000°C / 360 kW) (2)
- Conversion Heat – Electricity (Stirling engine (3) + ORC (4))



HEAT STORAGE

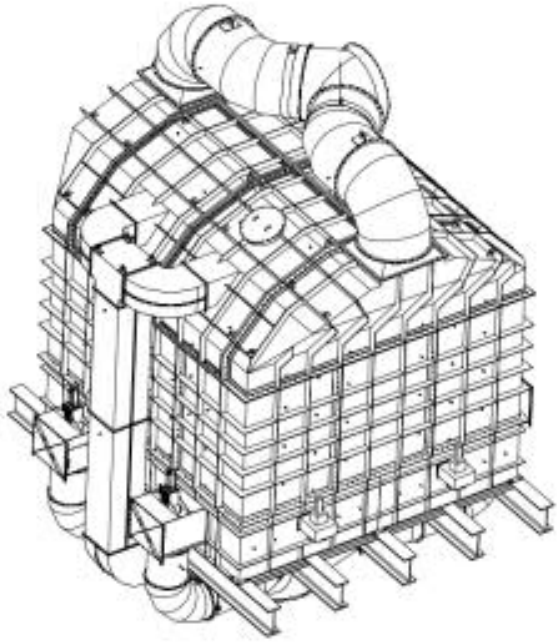
Demonstration plant 2

Target: equalization of thermal solar power to feed steam turbine process

<u>System components:</u>

- Concentrated solar tower plant
- 20 MWh storage capacity @ 750°C
- Conversion Heat – Electricity (Steam turbine process)

Deutsches Zentrum für Luft- und Raumfahrt DLR, Köln



Dürr Systems AG

谢谢！
THANKS!

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